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# PHILOSOPHICAL TRANSACTIONS.

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Monday, Novemb. 11. 1667.

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## The Contents.

*A description of an Instrument for Dividing a Foot into many thousand parts, and thereby measuring the Diameters of Planets to great exactness, &c. as it was formerly promised. An account of making a Dog draw his Breath just like a Wind-broken Horse. Divers Anatomical Observations on Humane Bodies. Several Instances of Peculiarities of Nature, both in Men and Brutes. A Confirmation of the Experiments mentioned in Numb. 27. to have been made in Italy, by injecting Acid Liquors into Blood. An observation about the double Membrane called Epiploon, which covers the Entrails of Animals, and is filled with Fat. Some Hortulan Communications about the curious Engrafting of Oranges and Lemons, or Citrons, upon one anothers Trees, and of one Individual Fruit, half Orange and half Lemon, growing on such Trees. An imitation of a way of preserving, in the more Northern Climates, Orange-trees all Winter long, without any Fire. Enquiries for Greenland. An Account of the Synopsis NOVÆ PHILOSOPHIÆ & MEDICINÆ Francisci Travagini, Medici Veneti.*

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## *A Description*

*Of an Instrument for dividing a Foot into many thousand parts, and thereby measuring the Diameters of Planets to a great exactness, &c. as it was promised, Numb. 25.*

*If the residence of the worthy Promiser of this Instrument, Mr. Richard Townley, had not been so remote from London, nor*

some other Impediments intervened (after it was come to hand), First on the Publisher's, then on the Engraver's side; the following Particulars concerning the same, promised some Months ago, had been imparted to the Publick a good while before this time: For the Draught of the Figures, representing the New Instrument it self, and the Description of the same, we are obliged to the ingenuity of Mr. Hook.

The first, second, and third Figures do represent the several parts of this Instrument; the fourth Figure, part of the Telescope, with the Instrument applied to it; and the fifth, the Rest, on which the whole reposeth.

The first Figure represents the brass Box with the whole Instrument, (excepting only the moveable Cover) and the Screws, by which it is fixt to the Telescope. In this Figure (*a a a a*) is a small oblong brass Box, serving both to contain the Screws, and its Sockets or Female Screws, and also to make all the several moveable parts of the Instrument to move very true, smooth, and in a simple direct Motion. To one end hereof is screwed on a round Plate of Brass (*b b b b*) about 3 inches over; the extream Limb of whose outside is divided into 100 equal parts, and numbered by 10, 20, 30, &c. Through the middle of this Plate, and the middle of the Box (*a a a*) is placed a very curiously wrought screw of about the bigness of a Goose Quill, and of the length of the Box, the head of which is by a fixed Ring or Shoulder on the inside, and a small springing Plate (*d d*) on the outside, so adapted to the Plate, that it is not in the least subject to shake. The other end of this screw is by another little screw (whose small point fills the Center or hole made in the end of the longer Screw for this purpose) render'd so fixt and steady in the Box, that there appears not the least danger of shaking. Upon the head of this screw without the springing Plate, is put on a small Index (*e e*), and above that a Handle (*m m*) to turn the Screw round as often as there shall be occasion, without at all endangering the displacing of the Index, it being put on very stiff upon a Cylindrical part of the Head, and the Handle upon a Square. The Screw hath that third of it, which is next the Plate, bigger than

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the other *two Thirds* of it, by at least as much as the depth of the *small Screw* made on it: The *thread* of the Screw of the bigger *Third* is as small again, as that of the Screw of the other *two Thirds*. To the *grosser Screw* is adapted a *Socket* (*f*) fasten'd to a long *Bar* or *Bolt* (*g g*), upon which is fasten'd the *moveable Sight* (*b*), so that every turn of the Screw promotes the Sight (*b*) either a *thread* nearer, or a *thread* farther off from the *fixt Sight* (*i*). The *Bar* (*gg*) is made exactly equal and fitted into two *small Staples* (*k k*), which will not admit of any shaking. There are 60 of these *threads*; and answerable thereto, are made 60 *divisions* on the edge of the *Bolt* or *Ruler* (*gg*); and a *small Index* (*l*) fixt to the *Box* (*aaa*) denotes, how many *threads* the edges of the two *Sights* (*b*) and (*i*) are distant; and the *Index* (*ee*) shews on the *Circular Plate* what part of a Revolution there is more, every Revolution, as was said before, being divided into 100 parts. At the same time that the *moveable Sight* (*b*) is moved forwards or backwards, or more *threads* of the *courser Screw*, is the *Plate* (*pp.* in *Fig. 2.*) by the means of the *Socket* (*q*) to which it is screwed, moved forward or backward, or more *threads* of the *finer Screw*: So that this *Plate*, being fixt to the *Telescope* by the *Screws* (*rr.* in *Fig. 2.*) so as the middle betwixt the *Sights* may lye in the *Axis* of the *Glass*, however the *Screw* be turn'd, the midſt betwixt the *Sights* will always be in the *Axis*, and the *Sights* will equally either open from it, or shut towards it.

*Fig. 2.* represents the *moveable Cover* containing the *Screws*, to be by the *Bookseller* cut off by the *pricked Line* (*xxx*) from the *Paper*, and to be fitly placed on *Figure 1.* according to the *pricked Line* (*yyy*) answering thereto; that by the taking off, as it were, or folding up of this *Cover*, the *inward contrivance* of the *Screws* and *Sights* may appear.

And because it is conceived by some ingenious Men, that it will be more convenient, instead of the Edges of the two *Sights* (*b* and *i*) to employ *two Sights* fitted with *Hairs*, therefore is added *Figure 3.* representing the two *Sights* (*r* and *s*) so fitted with *Threads* (*t* and *u*) that they may be conveniently used in the place of the *solid Edges* of the *Sights* (*b* and *i*).

The fourth *Figure* represents, How the *Screws* are to be put on.  
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The *Tube AD* is divided into 3 lengths, of which (as in ordinary ones) *BC* is to lengthen or contract, as the Object requires: But *AB* is here added, that at *A* you may put such *Eye-Glasses* as shall be thought most convenient, and to set them still at the distance most proper for them, *Indexes* or *Pointers*, which here are supposed to be at *B*, which length alters also in respect of divers persons Eyes. *E* is a Screw, by which the great *Tube* can be fixt so, as by the help of the Figures any smaller part of it can immediately be found, measuring only, or knowing the Divisions on *BC*, the distance of the *Obj et-glass* from the *Pointers*. *F* is the *Angular* piece of Wood, that lies on the upper Screw of the *Rest*. This *Rest* is represented by *Fig. 5.*

As for a Description of the *Uses* of this ingeniously contrived and very curious *Engine*, the Reader is desired to look back to the before-alleged *Numb. 25.*

#### *An Account*

*Of making a Dog draw his Breath exactly like a Wind-broken Horse, as it was devised and experimented by Dr. Richard Lower; with some of his Instructive Observations thereon.*

*This Experiment was made before the Royal Society, Octob. 17. 1667. after it had been tried by the Author in private some while before. The Account of it in his own words, is as follows.*

**A**fter I had often considered the manner and way of *Respiration*, and by many Observations been induced to believe, that the *Diaphragme* is the chief *Organ* thereof, I thought there could be no way more probable to try it, than by breaking the *Nerves*, by which its Motion is perform'd; which may be easily (as it was actually) done after the following manner.

First, pierce the side of the Animal between the *6th* and *7th* Rib in the middle of the *Thorax*, just over against the Region of the Heart, with a small *Incision-knife*, passing the Knife but just into the Cavity of the Breast (which you may justly know by finding no resistance to the point of it); then take it out, and put in a *Director*, or a small Quill made like it, and thrust it in about an inch, directing the end of it toward the *Sternum*, close to the inside of the Breast. Then cut upon it about an inch on the *Intercostal Muscles*; by which you may be secur'd from touching the

*Lungs*

Print, giving a brief Account of the Contents of the said Treatise to this effect, *viz.*

That this Author hath compos'd a *System* of Natural Philosophy by Observations and Experiments, accommodated to the benefit of Humane Life, and subservient to *Phyfick* and other *subalterne Arts*; which *Philosophy* he pretends to have raised on *Principles* that are certain Bodies drawn out of *Mixts*; which, though in themselves invisible and incoagulable, yet become, according to him, visible by their Contrariety and mutual Operation upon one another, and so do constitute the Temperaments of Concretes, and cause not only their Dissolution, but also their Redintigration.

These *Principles* he undertakes to prove to be *Two Salts*, call'd by him *Acidum* and *Salsum*; which, as they work more or less on one another, when blended, so they lose more or less of their Volatility, and the degrees of their Contrariety: And from their various Complication (in which he places the whole busines and moment of *Philosophy*) he holds, that that great multiplicity of Concretes, which is in the *Univerfe*, does result.

In particular, he deduceth from the said *Principles* the cause of *Ferments* and their variety, the nature of *Generations*, *Concretions*, *Putrefactions*, *Precipitations*, &c. and sheweth how those *Principles* run through all *Minerals*, *Vegetables*, and *Animals*, by their manifold Combinations, and various ways of acting on one another.

He explains also the mixtures of *Alkaly's*, *Vitriols*, *Armoniacks*, *Sulphurs*, *Mercuries*, and explicateth the properties of *Dissolvents*; as also *Tasts*, *Odours*, *Colours*, &c. all from the same *Principles*.

And having raised this Structure of his as far as he judgeth it sufficient for *Subordinate Arts*, he proceeds to adapt it to the Art of *Phyfick*. And applying it to *Animal Bodies*, he thence draws the diversity of *Humours* and *Tempers*, the beginning and duration of *Vital Heat*, the motion of the Limbs, the faculties of Entrails, the origin, vitality, and properties of the Blood, and the various Fermentations therein; shewing the Distempers of the Ferments and Juices in Animals, the nature of Coagulations, Dissolutions, Feavers, and other Symptoms; as also the original of Poysons in Animal Bodies; concluding with an Indication of the proper Remedies (as he conceives) of many Diseases.

*Whether this Philosophy be new, is easie to judge.*

*A Note to be inserted above, pag. 544. after line 12.*

**T**HIS *Reſt* (by Mr. *Hook*'s suggestion) may be render'd more convenient, if instead of placing the Screw *Horizontal*, it be so contriv'd, that it may be laid *parallel* to the *Equinoctial*, or to the *Diurnal Motion* of the Earth; for by that means the same thing may be perform'd by the single motion of *one Screw*, which in the other way cannot be done but by the turning of *both Screws*: As will easily appear to those that shall consider it.

In the *SAVOR*,

Printed by *T. N.* for *John Martyn*, Printer to the *Royal Society*, and  
are to be sold at the *Bell* a little without *Temple-Bar*, 1667.

N<sup>o</sup>. 29.

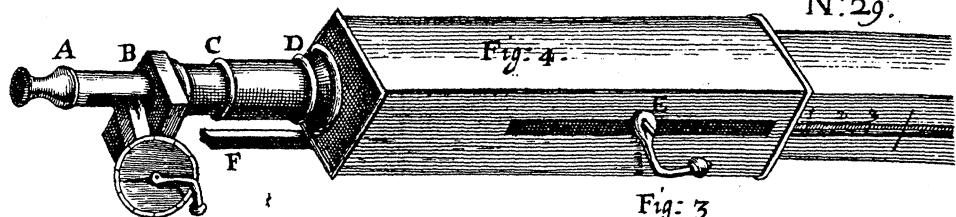


Fig. 3

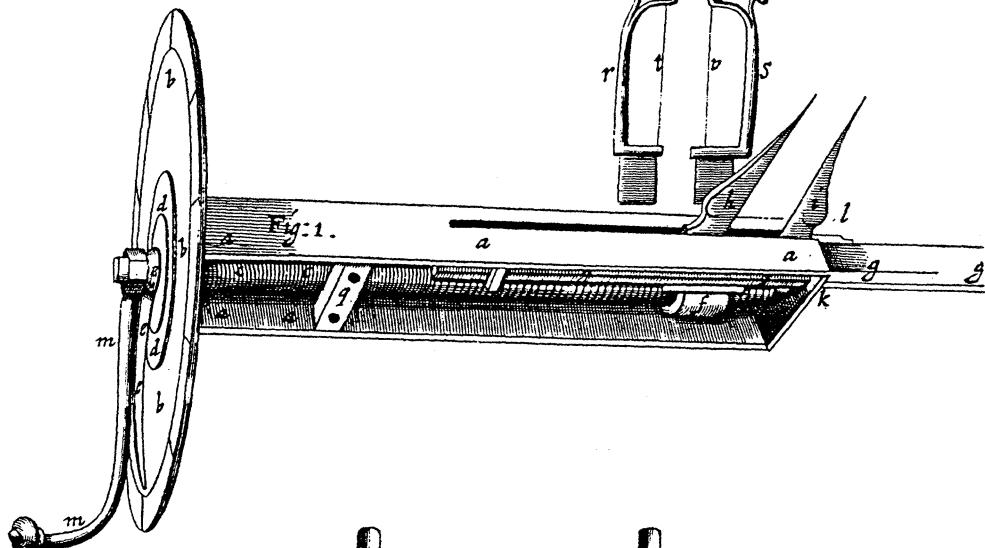
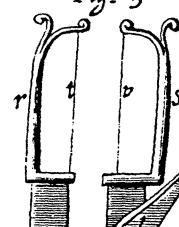


Fig. 5.

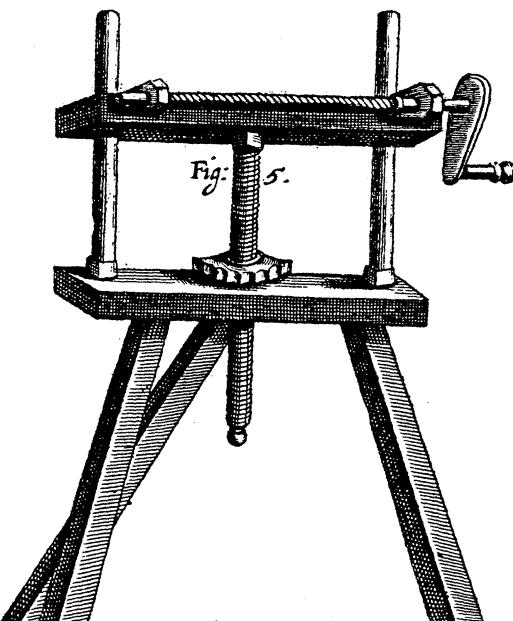


Fig. 2.

